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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/06/2005

Kuniyoshi Nakashima

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COOPER & DUNHAM, LLP
30 Rockefeller Plaza
20th Floor
NEW YORK, NY 10112

EXAMINER

BROOKS, JULIAN D

ART UNIT

PAPER NUMBER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/552,136	Applicant(s) NAKASHIMA ET AL.	
	Examiner JULIAN D. BROOKS	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 October 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on 04/13/2009 has been entered.

Response to Amendment

2. Claims 1-20 were pending in this application [10/06/2005].
3. Claims 1, 4, and 11 were amended [10/23/2008].
4. Claim 21-23 were added [10/23/2008].
5. Claims 1, 11 and 23 have been amended [04/13/2009].
6. Claims 1-20 are currently pending [04/13/2009].

Drawings

7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

- In Figure 15, item #1503 is not described or mentioned in the specification;

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- In Figure 18, item #1803 is not described or mentioned in the specification;

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

8. The Examiner's previous objection to claim 23 for minor informalities has been withdrawn in response to Applicant's appropriate amendments.

Claim Rejections - 35 USC § 112

9. The Examiner's previous rejection of claim 23, under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, has been withdrawn in response to Applicant's appropriate amendment.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-4, 6, 9-14, 16, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sabol et al., U.S. Patent Publication No. 2004/0101086 A1, filed on 10/27/2002, [herein Sabol], in view of Kim et al., U.S. Patent No. 6278761, published on 08/21/2001, [herein Kim], and further in view of Kvist et al., “Total and visceral adipose-tissue volumes derived from measurements with computed tomography in adult men and women: predictive equations.”, published on 1988, [herein Kvist].

With respect to claim 1, Sabol discloses “A medical image diagnosing support apparatus” (See Figures 1 & 2)

“comprising: a first extraction means which extracts a body region of a subject from a tomographic image of the subject acquired by a medical tomographic apparatus” (Page 4, Paragraphs 0040, 0043, & 0044, Page 5, Paragraph 0046, lines 1-2, and see Figure 5, extraction means corresponds to Sabol’s computer for tissue characterization);

“a second extraction means which extracts a non-adipose region from the body region” (Page 5, Paragraph 0046, lines 2-7, non-adipose region corresponds to Sabol’s organ such as the liver), and “sets a line surrounding the non-adipose region” (Page 5, Paragraph 0047, lines 5-19, sets a line corresponds to Sabol’s delineating the region),

“a third extraction means which extracts a total body adipose region from the body region” (Page 5, Paragraph 0046, lines 7-11, total body adipose region corresponds to Sabol’s fatty tissue);

“a display control means which controls display of the tomographic image on an image display device” (Page 3, Paragraph 0031, and Page 5, Paragraph 0046, lines 11-23)

It is however noted that Sabol fails to explicitly disclose “a separation means which separates the total body adipose region into a visceral adipose region and a subcutaneous adipose region based on whether a specified region is located inside or outside of the line surrounding the non-adipose region”; and

“with clear indication of the visceral adipose region and the subcutaneous adipose region”, as claimed.

On the other hand Kim teaches “a separation means which separates the total body adipose region into a visceral adipose region and a subcutaneous adipose region” (Col. 3, lines 15-31, visceral and subcutaneous adipose regions correspond to Kim's intra-abdominal cavity fat and subcutaneous fat respectively), and

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“with clear indication of the visceral adipose region and the subcutaneous adipose region” (Col. 3, lines 18-38, clear indication corresponds to Sabol’s high contrast image).

It would have been obvious to one of ordinary skill in the art at the time of applicant's invention to incorporate the teachings of Kim into the apparatus for quantifying tissue fat content of Sabol because both Kim and Sabol are directed to medical imaging specifically for viewing body tissue (Sabol: abstract; and Kim: Col. 2, lines 10-23), more particularly both are directed segmenting and distinguishing between the types of imaged body tissue (Sabol: Page 1, Paragraph 0008, also see Figures 5 & 6; and Kim: Abstract) and both are in the same field of endeavor. Furthermore, incorporating the teachings of Kim into Sabol would have allowed users of Sabol’s multi-energy computed tomography system to not only produce an image distinguishing lean and fat tissue (Sabol: Page 1, Paragraph 0007-0008), but also particularly further segment the imaged fat tissue into subcutaneous and intra-abdominal areas as suggested by Kim (Kim: abstract). Therefore, combination of Sabol and Kim, prior art would have been obvious to one of ordinary skill in the art at the time of invention because to apply the segmentation of subcutaneous and intra-abdominal fat tissue of as taught by Kim, to improve the quantifying fat tissue content CT system as disclosed by Sabol would have yielded the predictable result of improving diagnostic ability by determining and analyzing a subcutaneous to intra-abdominal fat ratio as suggested by Kim (Kim: Page 1, lines 38-46).

It is further noted that both Sabol and Kim fail to disclose fat region discrimination “based on whether a specified region is located inside or outside of the line surrounding the non-adipose region”, as claimed.

On the other hand Kvist teaches “based on whether a specified region is located inside or outside of the line surrounding the non-adipose region” (Abstract: lines 8-10, Page 1352, Col. 2, final 2 paragraphs, and Page 1353, Col. 1, and Figure 1, Kvist’s area are determined based on the encircling particular regions by a light pen).

It would have been obvious to one of ordinary skill in the art to incorporate the area determination of Kvist into the modified apparatus for quantifying tissue fat content of Sabol’s modified by Kim because Kvist, Kim, and Sabol are all directed to medical imaging specifically for viewing body tissue (Sabol: abstract; Kim: Col. 2, lines 10-23; and Kvist: Abstract, lines 1-2), more particularly all are then directed to segmenting and distinguishing between the types of imaged body tissue (Sabol: Page 1, Paragraph 0008, also see Figures 5 & 6; Kim: Abstract; and Kvist: Page 1352, Col. 2, final 2 paragraphs, and Figure 1) and both are in the same field of endeavor. Furthermore, incorporating Kvist into Sabol as modified by Kim would have allowed the users of Sabol to not only produce an image distinguishing lean and fat tissue (Sabol: Page 1, Paragraph 0007-0008), and further segment the imaged fat tissue into subcutaneous and intra-abdominal areas as suggested by Kim (Kim: abstract), but also particularly measure the volume of the particular areas as suggested by Kvist (Page 1353, Eqn 1). Therefore, combination of Sabol, Kim, and Kvist would have been

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obvious to one of ordinary skill in the art at the time of invention because to apply the encircling as taught by Kvist, to improve the quantifying fat tissue content CT system as disclosed by Sabol would have yielded the predictable result of improving diagnostic ability by determining particular areas, performing volumetric calculations, and anthropometric measurements for improved analyzation of the abdominal region.

With respect to claim 2, Sabol as modified by Kim and Kvist teaches “wherein the second extraction means extracts the non-adipose region by performing threshold processing of a pixel value in the tomographic image” (Page 4, Paragraph 0045, threshold processing corresponds to Sabol’s Hounsfield or CT number threshold techniques).

With respect to claim 3, Sabol as modified by Kim and Kvist, suggests “wherein the second extraction means sequentially searches for a pixel value range usually provided by the non-adipose region, and sets a threshold range of the threshold processing based on the most frequent pixel value in the pixel value range” (Kim: Col. 3, lines 10-14, & 38-67, and Col. 4, lines 1-17, Kim describes using histogram peaks to determine a threshold range, moreover, this range is limited to an area in which non-fat tissue will not be detected, it would be obvious to one of ordinary skill in the art to apply this described feature of Kim to set a threshold range based on pixel frequency in a range provided by the non

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adipose region, because it would allow for a more dynamic and accommodating detection since fat varies between people).

With respect to claim 4, Sabol as modified by Kim and Kvist teaches “wherein the second extraction means performs peripheral edge recognition processing of the non-adipose region” (Page 4 & 5 Paragraph 0045, lines 7-11), “sets a plurality of attention points on a recognized peripheral edge” (Page 5, Paragraph 0047, lines 5-19, setting a plurality of points corresponds to Sabol’s delineating the region),

“wherein the separation means separates the total body adipose region into a visceral adipose region and a subcutaneous adipose region based on the outline of the non-adipose region extracted” (Sabol: Page 5, paragraphs 0046, and 0047, Sabol delineates and extracts an organ which is not fat, furthermore see Figures 5 and 8, regions of various tissue is outlined. Furthermore see Page 4 & 5, paragraph 0045, Sabol clearly suggest using segmentation techniques such as edge detection).

It is however noted that Sabol as modified by Kim and Kvist fails to explicitly disclose “and interpolates spaces between the plurality of attention points by higher order spline interpolation to extract an outline of the non-adipose region”, and, as claimed.

On the other hand Sabol states on Page 5, Paragraph 0047, lines 5-19 that a region of interest is delineated manually or automatically, moreover utilizing a higher order spline interpolation for outlining an imaged object is well

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known in that art as admitted applicant on Page 3, lines 28-29 of "Amendments to the specification". It would be obvious to one of ordinary skill in the art to implement a well known in the art higher order spline interpolation technique because it would provide a sufficient delineation technique while also achieving a small interpolation error.

With respect to claim 6, Sabol as modified by Kim and Kvist discloses "wherein the third extraction means extracts the total body adipose region by subtracting the non-adipose region from the body region" (Sabol: Col. 3, lines 35-38).

With respect to claim 9, Sabol as modified by Kim and Kvist teaches "further comprising an area ratio calculation means which calculates area ratios of the total body adipose region" (Sabol: Page 5, Paragraph 0048, ratio corresponds to Kim's fat/lean ratio),

"the visceral adipose region, and the subcutaneous adipose region" (Kim: Col. 1, lines 38-46, and See Figure 8),

"wherein the display control means controls to display the area ratios calculated by the area ratio calculation means on the image display device" (Sabol: Page 5, Paragraph 0049).

With respect to claim 10, Sabol as modified by Kim and Kvist teaches “further comprising a print output means which prints and outputs the tomographic image and the area ratios controlled to be displayed on the image display device by the display control means” (Kim: Figures 2-7, tomographic images are outputted and printed as demonstrated by Kim’s figures).

With respect to claim 11, Sabol discloses “A medical image diagnosing support method” (See Figures 6 and 7),

“comprising: a first extraction step of extracting a body region of a subject from a tomographic image of the subject acquired by a medical tomographic apparatus” (Page 4, Paragraphs, 0043, & 0044, Page 5, Paragraph 0046, lines 1-2, and see Figure 5, extraction step corresponds to Sabol’s characterization);

“a second extraction step of extracting a non-adipose region from the body region” (Page 5, Paragraph 0046, lines 2-7, non-adipose region corresponds to Sabol’s organ such as the liver), “and setting a line surrounding the non-adipose region” (Page 5, Paragraph 0047, lines 5-19, sets a line corresponds to Sabol’s delineating the region),

“a third extraction step of extracting a total body adipose region from the body region” (Page 5, Paragraph 0046, lines 7-11, total body adipose region corresponds to Sabol’s fatty tissue); and

“a display control step of controlling display of the tomographic image on an image display device” (Page 3, Paragraph 0031, and Page 5, Paragraph 0046, lines 11-23).

It is however noted that Sabol fails to explicitly disclose “a separation step of separating the total adipose region into a visceral adipose region and a subcutaneous adipose region based on whether a specified region is located inside or outside of the line surrounding the non-adipose region”; and

“with clear indication of the visceral adipose region and the subcutaneous adipose region”, as claimed.

On the other hand Kim teaches “a separation step of separating the total adipose region into a visceral adipose region and a subcutaneous adipose region” (Col. 3, lines 15-31, visceral and subcutaneous adipose regions correspond to Kim's intra-abdominal cavity fat and subcutaneous fat respectively), and

“with clear indication of the visceral adipose region and the subcutaneous adipose region” (Col. 3, lines 18-38, clear indication corresponds to Sabol's high contrast image).

It would have been obvious to one of ordinary skill in the art at the time of applicant's invention to incorporate the teachings of Kim into the system for quantifying tissue fat content of Sabol because both Kim and Sabol are directed to medical image specifically for viewing body tissue (Sabol: abstract; and Kim: Col. 2, lines 10-23), more particularly both are directed segmenting and distinguishing between the types of imaged body tissue (Sabol: Page 1, Paragraph 0008, also see Figures 5 & 6; and Kim: Abstract) and both are in the same field of endeavor.

Furthermore, incorporate the teachings of Kim into Sabol would have allowed users of Sabol's multi-energy computed tomography method to not only produce an image distinguishing lean and fat tissue (Sabol: Page 1, Paragraph 0007-0008), but also particularly further segment the imaged fat tissue into subcutaneous and intra-abdominal areas as suggested by Kim (Kim: abstract).

Therefore, combination of Sabol and Kim, prior art would have been obvious to one of ordinary skill in the art at the time of invention because to apply the segmentation of subcutaneous and intra-abdominal fat tissue of as taught by Kim, to improve the quantifying fat tissue content CT method as disclosed by Sabol would have yielded the predictable result of improving diagnostic ability by determining and analyzing a subcutaneous to intra-abdominal fat ratio as suggested by Kim (Kim: Page 1, lines 38-46).

It is further noted that both Sabol and Kim fail to disclose fat region discrimination "based on whether a specified region is located inside or outside of the line surrounding the non-adipose region", as claimed.

On the other hand Kvist teaches "based on whether a specified region is located inside or outside of the line surrounding the non-adipose region" (Abstract: lines 8-10, Page 1352, Col. 2, final 2 paragraphs, and Page 1353, Col. 1, and Figure 1, Kvist's area are determined based on the encircling particular regions by a light pen).

It would have been obvious to one of ordinary skill in the art to incorporate the area determination of Kvist into the modified quantifying tissue fat content of Sabol's modified by Kim because Kvist, Kim, and Sabol are all directed to

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medical imaging specifically for viewing body tissue (Sabol: abstract; Kim: Col. 2, lines 10-23; and Kvist: Abstract, lines 1-2), more particularly all are then directed to segmenting and distinguishing between the types of imaged body tissue (Sabol: Page 1, Paragraph 0008, also see Figures 5 & 6; Kim: Abstract; and Kvist: Page 1352, Col. 2, final 2 paragraphs, and Figure 1) and both are in the same field of endeavor. Furthermore, incorporating Kvist into Sabol as modified by Kim would have allowed the users of Sabol to not only produce an image distinguishing lean and fat tissue (Sabol: Page 1, Paragraph 0007-0008), and further segment the imaged fat tissue into subcutaneous and intra-abdominal areas as suggested by Kim (Kim: abstract), but also particularly measure the volume of the particular areas as suggested by Kvist (Page 1353, Eqn 1).

Therefore, combination of Sabol, Kim, and Kvist would have been obvious to one of ordinary skill in the art at the time of invention because to apply the encircling as taught by Kvist, to improve the quantifying fat tissue content CT as disclosed by Sabol would have yielded the predictable result of improving diagnostic ability by determining particular areas, performing volumetric calculations, and anthropometric measurements for improved analyzation of the abdominal region.

With respect to claim 12, claim 12 is rejected on the same basis as the above rejected claim 2.

With respect to claim 13, claim 13 is rejected on the same basis as the above rejected claim 3.

With respect to claim 14, claim 14 is rejected on the same basis as the above rejected claim 4.

With respect to claim 16, claim 16 is rejected on the same basis as the above rejected claim 6.

With respect to claim 19, claim 19 is rejected on the same basis as the above rejected claim 9.

With respect to claim 20, claim 20 is rejected on the same basis as the above rejected claim 10.

12. Claims 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sabol et al., U.S. Patent Publication No. 2004/ 0101086 A1, filed on 10/27/2002, Kim et al., U.S. Patent No. 6278761, published on 08/21/2001, Kvist et al., "Total and visceral adipose-tissue volumes derived from measurements with computed tomography in adult men and women: predictive equations.", published on 1988, [herein Kvist], and further in view of Grauer et al., "Quantification of Body fat Distribution in the Abdomen using Computer Tomography", published in April 1984.

With respect to claim 5, Sabol as modified by Kim and Kvist teaches “wherein the third extraction means extracts the total body adipose region from the body region” (Page 5, Paragraph 0046, lines 7-11, total body adipose region corresponds to Sabol's fatty tissue).

It is however noted that Sabol as modified by Kim and Kvist fails to explicitly teach “further comprising an epidermal tissue layer removal means which removes an epidermal tissue layer in the non-adipose region”, and

“from which the epidermal tissue layer is removed by the epidermal tissue layer removal means”, as claimed.

On the other hand Kim states in Col. 3, lines 1-43, and Figures 3-7 that subcutaneous and intra-abdominal fat images are obtained from tomographic scans of a person's abdominal region, which obviously provides “further comprising an epidermal tissue layer removal means which removes an epidermal tissue layer in the non-adipose region”, and “from which the epidermal tissue layer is removed by the epidermal tissue layer removal means”, because Kim's original tomography image includes materials ranging from air to dense bone with respect to the human body, thus skin is included in this range, furthermore, Kim adjust the Hounsfield value range to distinguish fat from other imaged tissue and bodily material, therefore skin is included in Kim's distinguishing between fat and non fat regions. Furthermore see Grauer Page 632, Col. 1, lines 3-8, and Figure 1, epidermal tissue corresponds to Grauer skin among other non-fat regions distinguished between.

With respect to claim 15, claim 15 is rejected on the same basis as the above rejected claim 5.

13. Claims 7, 8, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sabol et al., U.S. Patent Publication No. 2004/ 0101086 A1, filed on 10/27/2002, Kim et al., U.S. Patent No. 6278761, published on 08/21/2001, Kvist et al., "Total and visceral adipose-tissue volumes derived from measurements with computed tomography in adult men and women: predictive equations.", published on 1988, [herein Kvist], and further in view of Wollenweber, US Patent No. 7155047 B2, filed on 12/20/2002.

With respect to claim 7, Sabol as modified by Kim and Kvist teaches "body adipose measurement"

It is noted that Sabol, Kim, and Kvist fail to teach "further comprising a determination means which determines whether the tomographic image is suitable for", and

"wherein the display control means controls to display a determination result by the determination means on the image display device", as claimed.

On the other hand Wollenweber teaches "further comprising a determination means which determines whether the tomographic image is suitable for" (Col. 7, lines 5-34, & 54-62, and Figure 2, item 68, determination of suitable image corresponds to Wollenweber's thresholding to determine images with quality problems);

“wherein the display control means controls to display a determination result by the determination means on the image display device” (Col. 7, lines 47-53 determination result corresponds to Wollenweber’s peaks exceeding thresholds).

It would have been obvious to one of ordinary skill in the art at the time of applicant's invention to incorporate the teachings of Wollenweber into the modified system for quantifying tissue fat content of Sabol as modified by Kim and Kvist because all, Wollenweber, Kim, Sabol, and Kvist are directed to medical imaging (Wollenweber: Col. 1, lines 40-55, and Figures 1 & 2; Sabol: abstract; Kim: Col. 2, lines 10-23; and Kvist: Abstract, lines 1-2), more particularly both Wollenweber and Sabol are directed to computed tomography imaging systems with similar basic techniques (Sabol: Page 2 -3, Paragraph 0029; and Wollenweber: Col. 5, lines 17-39). Furthermore, incorporate the teachings of Wollenweber into Sabol as modified by Kim and Kvist would have allowed users of Sabol’s multi-energy computed tomography system to not only produce an image distinguishing lean, subcutaneous, and intra-abdominal fat tissue (Sabol: Page 1, Paragraph 0007-0008; and Kim: abstract), but also assesses the loss of image quality due to lower system sensitivity as clearly suggested by Wollenweber (Wollenweber: Col. 1, lines 6-20). Therefore, it would have been obvious to one of ordinary skill in the art to use the multiple dataset collection and analyzation of Wollenweber to analyze and threshold the obtained images in Sabol’s CT system to determine quality images because Wollenweber further suggest that image quality is inversely proportional to patient size (Wollenweber:

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Col. 1, lines 21-30), while Sabol's system is directed towards examining images of patients of larger size (Sabol: Page 1, Paragraph 0005 and 0006).

With respect to claim 8, Sabol, and modified by Kim, Kvist, and Wollenweber teach "wherein when the determination means obtains error information that the tomographic image is not obtained from a site suitable for body adipose measurement of the subject or not acquired by a predetermined medical tomographic apparatus, the display control means controls to display the error information on the image display device" (Wollenweber: Col. 7, lines 41-53 error information corresponds to Wollenweber's peaks exceeding thresholds, and Wollenweber's white bar artifacts displayed in erroneous images).

With respect to claim 17, claim 17 is rejected on the same basis as the above rejected claim 7.

With respect to claim 18, claim 18 is rejected on the same basis as the above rejected claim 8.

14. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sabol et al., U.S. Patent Publication No. 2004/ 0101086 A1, filed on 10/27/2002, Kim et al., U.S. Patent No. 6278761, published on 08/21/2001, Kvist et al., "Total and visceral adipose-tissue volumes derived

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from measurements with computed tomography in adult men and women: predictive equations.”, published on 1988, [herein Kvist], and further in view of Rosania et al. U.S. Patent Application Publication No. 2003/0059093 A1, published on 03/27/2003, [herein Rosania].

With respect to claim 21, Sabol as modified by Kim and Kvist discloses “wherein the separation means extracts a region between a contracted circumscribed circle and a muscle region as the subcutaneous adipose region” (Kvist: Page 1353, See Figure 1),

It is however noted that Sabol as modified by Kim and Kvist fails to explicitly “when the circumscribed circle, which circumscribes the body region divided radially into predetermined numbers having the barycenter of the body region as the center, is contracted until the circle circumscribes the muscle region which is extracted by performing threshold processing to the body region” as claimed.

On the other hand Sabol as modified by Kim and Rosania suggest “when the circumscribed circle, which circumscribes the body region divided radially into predetermined numbers having the barycenter of the body region as the center, is contracted until the circle circumscribes the muscle region which is extracted by performing threshold processing to the body region” (Rosania: Page 4, Paragraph 0053-0056, and See Figure 1E and F, Rosania describes a segmentation and distribution determination technique in which circumscribing circles, radial divisions, and thresholds are used to determine the organization of a cellular object by determining the distribution of the cellular components).

It would have been obvious to one of ordinary skill in the art to incorporate the distribution and organization technique of Rosania into the tissue fat content quantification of Sabol as modified by Kim and Kvist because all are directed to segmenting and determining the content and content distribution of medical images. Furthermore, Rosania's method is especially suited for determining organization of an image with respect to various components within the image such as Rosania's cell nucleolus and plasma membrane which could be utilized for Sabol or Kim's muscle and fat regions etc, and therefore yield the predictable result of determining more detailed information about the temporal-spatial dynamics of Sabol's anatomical images.

With respect to claim 22, Sabol as modified by Kim and Kvist teaches "further comprising means for extracting a navel region of the subject from the tomographic image of the subject" (Kim: See Figures 2-5, naval region corresponds to Kim's image centers), "wherein the separation means extracts a region where muscle and bone region are removed" (Kim: Col. 3, lines 10-21 removed muscle and bone region correspond to Kim's narrowed Hounsfield value range), "as the subcutaneous adipose region from a portion of the body region included in a circular area of interest" (Kim: Col. 3, lines 15-38, and See Figure 3),

It is however noted that both Sabol, Kim and Kvist fails to teach "in which a radius of the circular area is half of a distance between a first attention point set at a peripheral edge of the non-adipose region and a second attention point set

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at middle point of each partial region of the muscle and bone region included in the regions where the navel region is removed from the extracted body region” as claimed.

On the other hand Sabol as modified by Kim, Kvist and Rosania teach “in which a radius of the circular area is half of a distance between a first attention point set at a peripheral edge of the non-adipose region and a second attention point set at middle point of each partial region of the muscle and bone region included in the regions where the navel region is removed from the extracted body region” (See Figure 1F, Rosania's right-side middle box, Rosania's inner circular area is about half the radius of the larger circle, therefor for the region between circles, the distance is half the radius of the large circle).

It would have been obvious to one of ordinary skill in the art to incorporate the distribution and organization technique of Rosania into the tissue fat content quantification of Sabol as modified by Kim because all are directed to segmenting and determining the content and content distribution of medical images. Furthermore, Rosania's method is especially suited for determining organization of an image with respect to various components with in the image such as Rosania's cell nucleolus and plasma membrane which could be substituted for Sabol or Kim's muscle and fat regions etc, and therefore yield the predictable result of determining more detailed information about the temporal-spatial dynamics of Sabol's anatomical images.

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15. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sabol et al., U.S. Patent Publication No. 2004/ 0101086 A1, filed on 10/27/2002, Kim et al., U.S. Patent No. 6278761, published on 08/21/2001, Kvist et al., “Total and visceral adipose-tissue volumes derived from measurements with computed tomography in adult men and women: predictive equations.”, published on 1988, [herein Kvist], Wollenweber, US Patent No. 7155047 B2, filed on 12/20/2002, and further in view of Griffin et al. U.S. Patent Application Publication No. 2004/0207625A1, filed on 04/18/2003, [herein Griffin].

With respect to claim 23, Sabol as modified by Kim , Kvist, and Wollenweber teaches “further comprising means for extracting a navel region of the subject from the tomographic image of the subject” (Kim: See Figures 2-5, naval region corresponds to Kim’s image centers), “wherein the determination means determines that the tomographic image is suitable for body adipose measurement” (Wollenweber: Col. 7, lines 5-34, & 54-62, and Figure 2, item 68, determination of suitable image corresponds to Wollenweber's thresholding to determine images with quality problems), “when the navel region is included in the extracted non-adipose region” (Kim: See figures 3-6).

It is however noted that Sabol, Kim, Kvist, and Wollenweber fail to teach “when the air region is within a predetermined ratio”, as claimed.

On the other hand Griffin teaches “when the air region is within a predetermined ratio” (Page 17, Paragraph 0236).

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It would have been obvious to one of ordinary skill in the art to incorporate the ratio of open air target and null target data of Griffin into the modified quantifying fat tissue content of Sabol as modified by Kim, Kvist, and Wollenweber, because all are directed to medical imaging and particularly Sabol, Kim, Kvist, and Griffin are all directed to establishing tissue content, moreover, both Wollenweber and Griffin are specifically directed to establishing quality metrics regarding the obtained image data. Furthermore, incorporating Griffin into Sabol as modified by Kim, Kvist, and Wollenweber would have allowed users of Sabol's system to not only determine the quality of an obtained image but also further improve the system to account for imaging system artifacts as suggested by Griffin (Page 17, Paragraph 0235 and 0237), and thus yield the predictable result of obtaining reduced noise image data.

Response to Arguments

16. Applicant's arguments, filed on 04/13/2009, under REMARKS with respect to claims 1 and 11 have been considered but are moot in view of the new ground(s) of rejection.

- Specifically, with respect to Applicant's arguments on Pages 9-10, bridging paragraph, Page 10, lines 7-10, and Page 12, paragraphs 2-4, that none of the cited art teaches, suggests, or discloses "based on whether a specified region is located inside or outside of a line surrounding the non-adipose region", Examiner notes the rejection of

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the independent claims above, specifically the Kvist reference, which teaches adipose tissue area determination by encircling areas.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. **Arnold, 20030095695A1** – art is directed to the measurement of tissue densities in CT scans, particularly, Page 4, paragraphs 0042-0045, 0049, and Page 5, paragraph 0054, in the same field of endeavor, Arnold discloses a utilization of region boundaries at least suggestible to the use of boundaries to differentiate tissue regions.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JULIAN D. BROOKS whose telephone number is (571)270-3951. The examiner can normally be reached on Monday to Thursday EST 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Julian D Brooks/
Examiner, Art Unit 2624

06/13/2009

/Vikkram Bali/
Supervisory Patent Examiner, Art Unit 2624